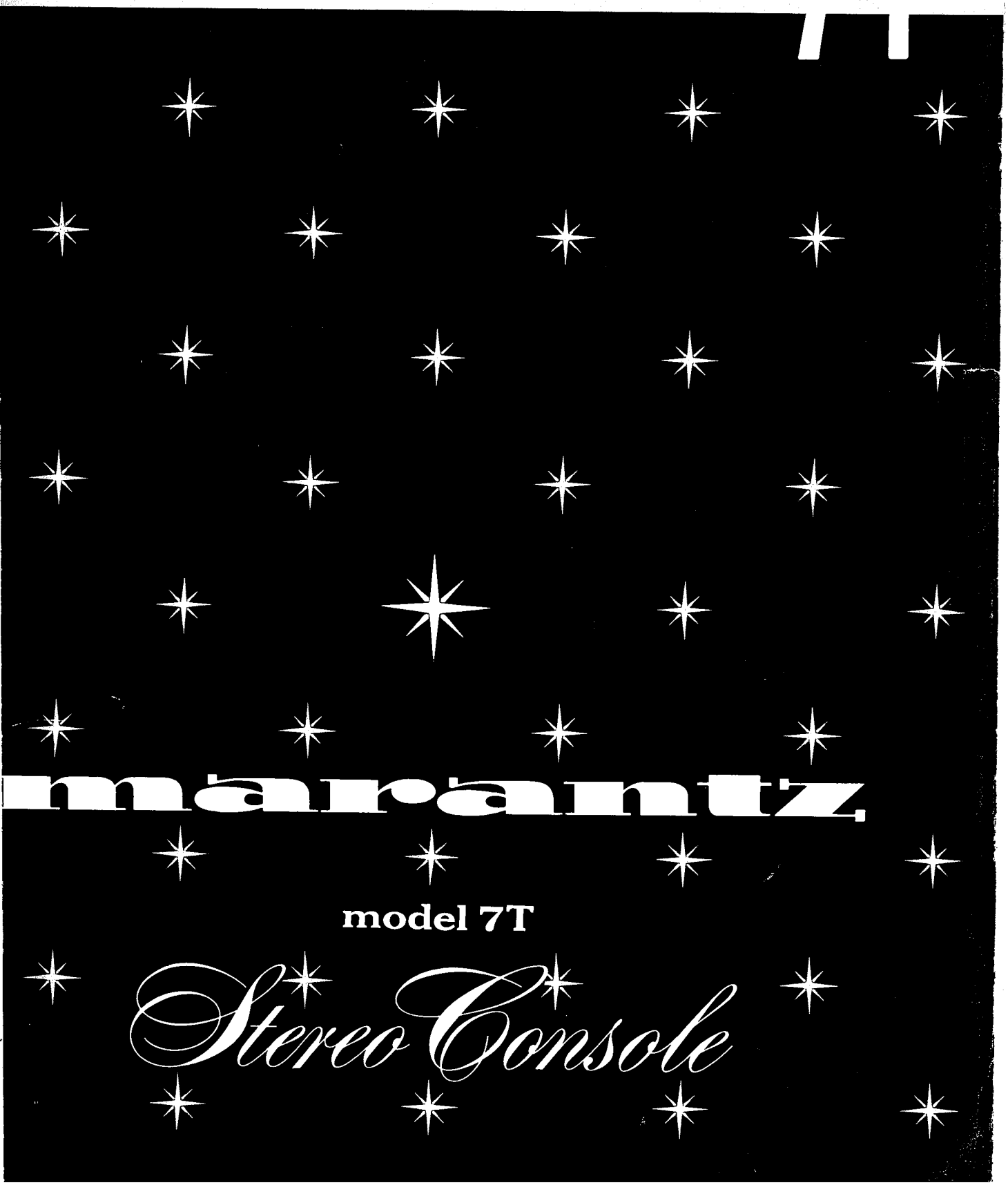
Property Imperial Sound.

211

service manual



marantz

model 7T

Stereo Console

marantz

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service data for the Marantz Model 7T Stereo Console.

Adjustment information and troubleshooting hints included in this manual are intended for use by the knowledgable and experienced technician only. All instructions should be read carefully and understood fully before proceeding with any service. No attempt should be made to proceed without a good understanding of the operation of the Stereo Console and an adequate proficiency in the use of test equipment required for servicing.

Symptoms (and their remedies) listed in the Troubleshooting Section are those which might occur in some units—based upon information derived from a significant sampling of units in the field. As the Marantz Company becomes aware of other field problems, supplementary service bulletins will be issued to all stations. To improve this service, all problems (and their solutions) not covered in this service manual should be brought to the attention of the Service Manager at the New York City location.

FUNCTIONAL DESCRIPTION

Figure 1 is a simplified block diagram of the Model 7T Stereo Console showing its functional elements and signal flow within the console. The unit consists of two identical channels, common mode switching circuits, common center channel circuits, and a common power supply. For clarity, only channel A and the common circuitry will be described.

SELECTOR switch S1 contains three individual functional sections, which provide input, feedback, and output routing of the signals. Input section 1F selects one of the four low-level inputs and routes the selected signal to the preamp circuit in the low-level amplifier board. Sections 2F and 2R, the feedback sections, function with the preamp. These sections choose an appropriate equalization network to be utilized with the selected input signal. Each feedback network provides precise equalization for the corresponding input signal selected. Output section 1R couples the amplified signal to TAPE FUNCTIONS switch S4. The selected high-level input signal is coupled directly to the TAPE FUNCTIONS switch from the input jack via the output section of the SELECTOR switch. All inputs except the one selected and the tape input are shorted to ground by the input section of S1, thus eliminating any interference from this source.

The preamp consists of Q201, Q203 and Q205 in the low-level amplifier board. The preamp raises the level of all low-level inputs, while introducing the proper equalization necessary for the selected input. The gain vs. frequency response characteristics of the preamp is determined by the equalization network in the feedback loop. In the MICROPHONE position, equalization is accomplished with a single resistor. This sets the preamp gain to 40 db while the frequency response characteristic is held ± 0.1 db from 20 to 2,000 Hz. In the PHONO 1 and PHONO 2 positions, the desired equalization network is chosen by the settings of PHONO EQUALIZER switch S2. The three settings available are 78, R1AA, and LP. Figure 2 shows the relative gain vs. frequency characteristics of the preamp in the three PHONO EQUALIZER switch positions. In the figure, the 0 db reference level corresponds to a gain of 42 db. In the TAPE HEAD position of SELECTOR S1, an adjustable equalization network is switched into the feedback loop. The variable element is TAPE EQU. ADJUST potentiometer R15, located on the rear panel of the unit. This network sets the preamp gain to 42 db at 500 Hz. At frequencies below 500 Hz, the gain is fixed. Frequency response is variable over a range of 13.5 db at 10 KHz. (See figure 2.) Each unit is factory

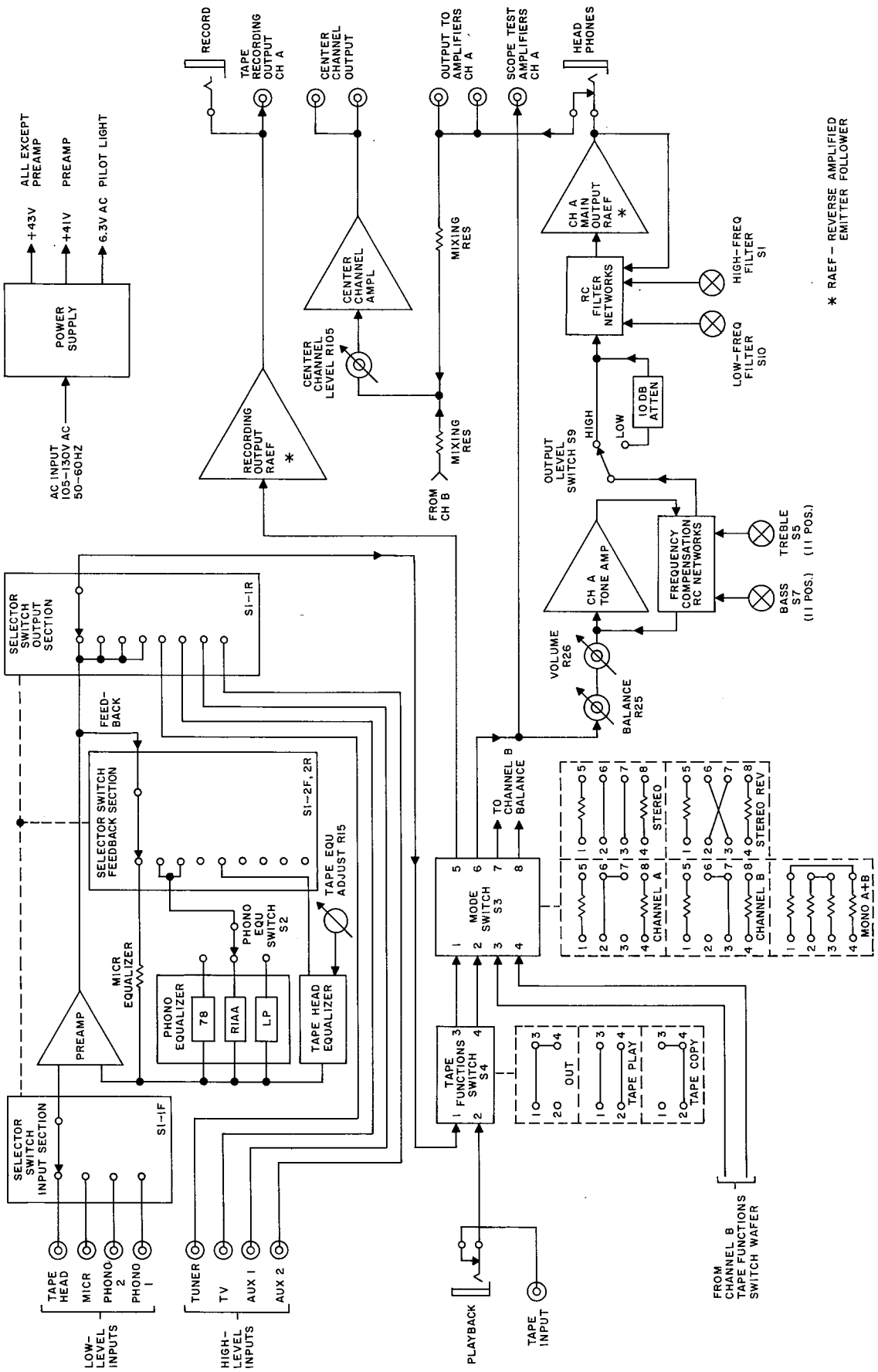


Figure 1. Model 7T Stereo Console, Block Diagram

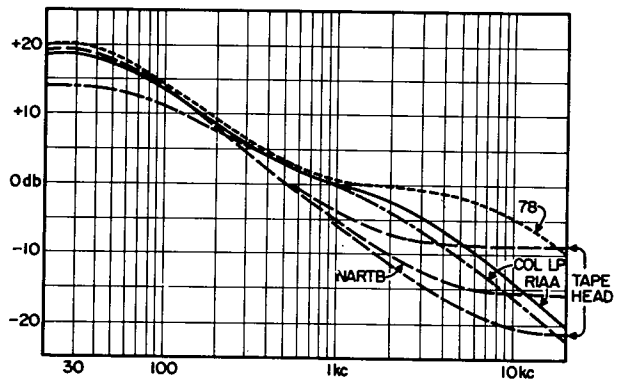


Figure 2. Phono and Tape Equalization Characteristics

et for NARTB equalization. The control is marked t the NARTB setting and may be returned to that etting without instruments.

The TAPE FUNCTIONS switch S4, controls the rout- ng of the selected and tape input signals. The tape nput signal can originate either from the TAPE INPUT ack on the rear panel of the unit or the PLAYBACK ack on the unit front panel. In the OUT position, the elected input signal is fed through the MODE switch o the tone amplifier and the recording output reverse mplified emitter follower (RAEF), while the tape nput signal is left open-circuited. In the TAPE PLAY r monitor position, the selected input signal is ap- lied only to the recording output RAEF, while the ape input signal is fed to the tone amplifier. In the APE COPY position, the selected input signal is ot processed. The tape input signal is fed to both he tone amplifier and the recording output RAEF.

Inter-channel switching is controlled by MODE witch S3. In the CHANNEL A position, only the hannel A input is applied to both tone amplifiers (A nd B). In the CHANNEL B position, only channel B puts are processed (by both channels). In MONO + B, a resistive mixing network is selected by the witch contacts. Channel A and channel B inputs are ixed in equal proportions and applied to both A nd B tone amplifiers. In the STEREO position, the hannel A and B inputs are fed to their respective one amplifiers. The STEREO REVERSE position re- erses the destination, i.e., channel A input is fed to he B tone amplifier and channel B input is fed to he A tone amplifier. All signals are available for onitoring at the SCOPE TEST output jack on the ear panel.

NOTE

Units having serial numbers between 12501 and 15000 have the MODE switch placed electrically before the TAPE FUNCTIONS switch. On these units, all MODE functions are available at the RECORD output jack, but only the MONO A + B signal is available at the tape PLAYBACK jack.

Units having serial numbers below 12501 also have the same electrical configuration, but the MONO A + B signal is not available at the tape PLAYBACK jack.

The recording output RAEF is a feedback amplifier having low output impedance (approximately 470 ohms) and is used for driving the TAPE RECORDING OUTPUT jack. The amplifier consists of transistors Q301 and Q303. It has unity gain (0 db) and a flat frequency response from 20 to 20,000 Hz.

The relative levels between the channel A and B signals are adjusted by BALANCE control R25. This is a full-range dual potentiometer which permits attenuation of either channel to complete cutoff. One section controls each channel. At the center, both channels are attenuated equally (for balance). Attenuation is approximately 3 db. In the extreme clockwise position, the channel B input is fully attenuated; channel A passes without attenuation. The opposite condition exists in the counter-clockwise position. VOLUME control R26 is also a dual potentiometer, but both signals are attenuated by the same factor, in unison. Tracking is maintained within 2 db throughout the range.

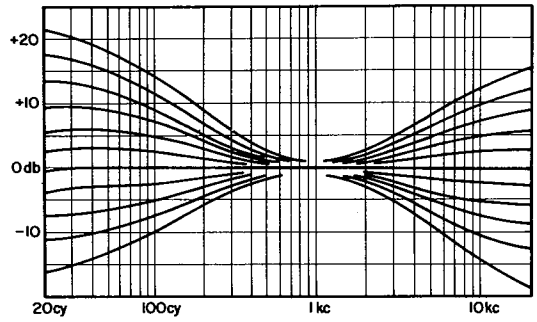


Figure 3. Tone Control Characteristics

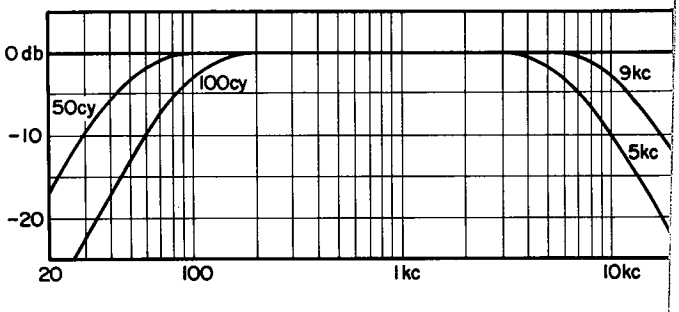


Figure 4. Low-Frequency and High-Frequency Filter Characteristics

The tone amplifier provides high gain and selected frequency compensation for all main channel outputs. The tone amplifier consists of Q401, Q403, and Q405 on the tone amplifier board. Both the BASS and TREBLE controls (S7 and S5) are 11-position switches. In each position an RC network introduces appropriate frequency compensation by altering the characteristics of the tone amplifier feedback loop. With both controls at the center position (straight up), the gain of the tone amplifier is 21.5 db with a flat frequency response from 20 to 20,000 Hz. In other switch positions the overall frequency response is varied. The gain at 1000 Hz, however, does not change. At 10,000 Hz each position of the TREBLE control changes the gain by 2½ db. The BASS control changes the gain of the tone amplifier by 3 db per step at 50 Hz. Frequency response curves for each switch position are shown in figure 3. In this figure, the 0 db reference level corresponds to a gain of 21.5 db.

The signal from the tone amplifier is fed to the main output RAEF. This signal level is attenuated by 10 db when OUTPUT LEVEL switch S9 is in the LOW position.

The main output RAEF is a feedback amplifier also having low output impedance (approximately 470 ohms), and is used for driving the main output circuit (Q501 and Q503). It also operates as a low and high-frequency filter. With LOW-FREQ FILTE switch S10 and HIGH-FREQ FILTER switch S11 i their OUT positions, the main output RAEF has unit gain over the entire audio band. With a filter switche in, a filter network in the feedback loop attenuate the frequency response of the circuit at a rate of 1 db per octave, while maintaining the 3 db points a the filter frequency designated by the front pan switch position. The LOW-FREQ switch positions a 50 or 100 (Hz); the HIGH-FREQ switch positions a 9 KC and 5 KC. Figure 4 shows the frequency curve resulting from the use of the two filters.

The signals from both channel A and B main ou puts are mixed and fed to the center channel amp fier. This amplifier consists of transistors Q505 a Q506 on the main RAEF board. The gain of the amp fier is 10 db. However, the mixing resistors introdu a loss. The overall gain from each main output the center channel output is 2 db, with the CENTE CHANNEL LEVEL at maximum. The frequency sponse of the center channel amplifier is flat fr 20 to 20,000 Hz, with an output impedance approximately 470 ohms.

The power supply is a conventional full-wave brid rectifier with a capacitor input filter providing re lated dc voltages to all active functions of the u A built-in turn-on delay of 2 to 3 seconds elimina extraneous turn-on pulses and noises.

TECHNICAL SPECIFICATIONS

Gain—Microphone input to main output	61.5 ± 1.0db*
Phono input to main output	63.5 ± 1.0db*
Tape-Head input to main output	63.5 ± 1.0db*
Phono input to recording output	42.0 ± 0.2db
Microphone input to recording output	40.0 ± 0.2db
High level input to main output	21.5 ± 0.8db*
Frequency Response	±0.5db, 20 to 20,000 Hz.
IM Distortion	0.15% at 10 volts rms equivalent peak output
Total Harmonic Distortion—1 volt @ 2kHz	non-measurable
5 volts @ 2kHz	0.02%
10 volts @ 2kHz	0.03%
Dynamic Range (phono input to recording output) at 1 kHz and at rated distortion	100db, typical
Total Noise	1 micro volt equivalent input
Input Impedance—Phono 1 and Phono 2	47K ohms
Microphone and Tape-Head	approximately 450K
High level	approximately 200K
Equalization, tone control and filter characteristics	As shown in Figures 2, 3, and 4
Power requirements**	105 to 130 volts, rms
	50 to 60 Hz
	9 watts
Dimensions—Panel Width	15⅜ inches
Panel Height	5¾ inches
Depth behind panel	8 inches
Clearance for panel and knobs	⅞ inch
Weight—Unit alone	9 pounds
Packed for shipment	11 pounds

* With BALANCE control set to normal position.
** Split primary windings permit adaptation to 210-270 volts.

Specifications subject to change without notice.

TEST EQUIPMENT REQUIRED FOR SERVICING

Table I lists the test equipment required for testing and servicing the Model 7T Stereo Console. If the test equqipment listed in the table is not available, suitable equivalents may be used.

TABLE I. TEST EQUIPMENT REQUIRED

Intermodulation Meter	Audio Instrument Model 168A
AC Vacuum Tube Voltmeter	Ballantine Model 300H
Senior Volt-Ohmyst	RCA WV-98C

CONVERSION TO 240 VOLT OPERATION

To convert the amplifier from 120 volt to 240 volt operation, proceed as follows. Figure 5 shows the connections required for operation of power transformer TP8 at both 120 volt and 240 volt operation.

1. Install and secure an insulated standoff terminal (Marantz part number 87-1019) in the spare hole located near the line cord.
2. Secure the terminal with a 6-32 x ¼-inch machine screw.
3. Connect the black/red and black/white power transformer leads together at this terminal.
4. Cover the voltage rating markings on the chassis and attach a tag (Marantz part number 99-1001) to the line cord. Do not replace the fuse.

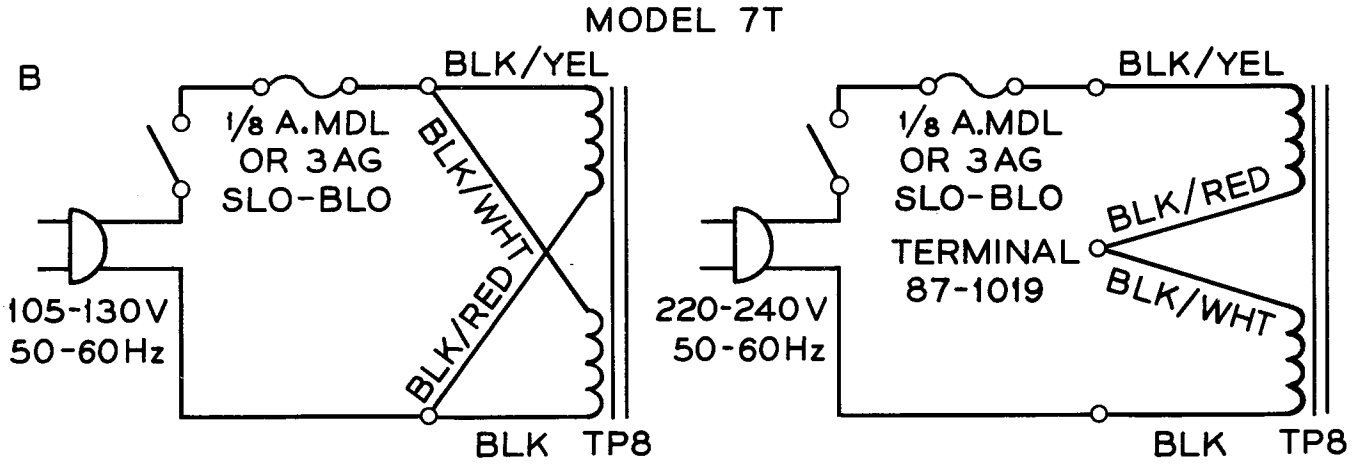


Figure 5. 240 Volt Conversion Diagram

PERFORMANCE VERIFICATION TEST

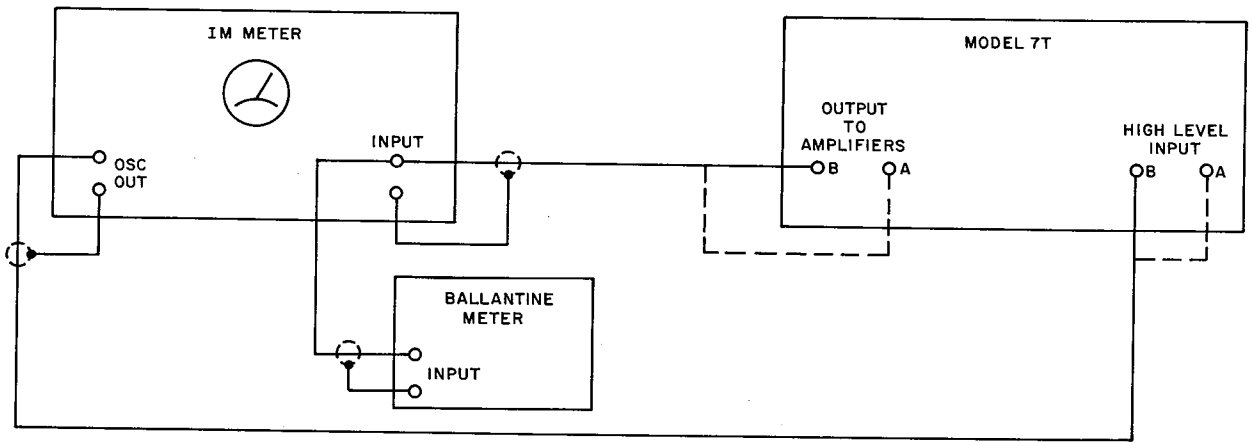
A. TEST EQUIPMENT. An Intermodulation (IM) Meter and an AC VTVM of the type listed in table I are required to make intermodulation distortion tests of the 7T.

B. IM DISTORTION, HIGH-LEVEL.

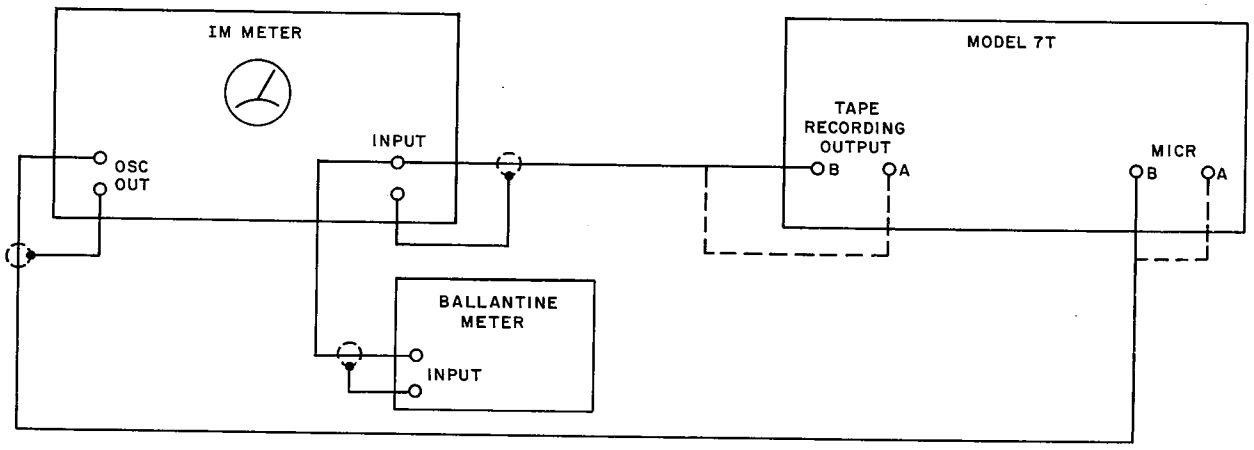
1. Connect the oscillator output of the IM meter to any of the high level input jacks on the 7T, as shown in A of figure 6. Connect the channel B OUTPUT TO AMPLIFIERS jack to the input of the IM meter.
2. Set the VOLUME control to maximum, the BALANCE control to RIGHT ONLY, the tone controls to center position (flat response), the filters to OUT, the MODE switch to CHANNEL B, and the SELECTOR switch to the high level input.
3. Adjust the output level of the IM meter to produce an 8-volt signal at the 7T output jack, as indicated on the VTVM.
4. Set the IM meter function to calibrate and calibrate the meter.
5. Set the IM meter function to read % and real the percent of intermodulation distortion directly on the IM meter. Use the lowest scale possible for the reading. The IM distortion should be no greater than 0.15%.
6. Set the MODE switch and BALANCE control for channel A operation and repeat the procedure to check high-level IM distortion on channel A.

C. IM DISTORTION, LOW-LEVEL

1. Connect the oscillator output of the IM meter to the channel B MICR input jack on the 7T, as shown in B of figure 6. Connect the channel B TAPE RECORDING OUTPUT jack to the input of the IM meter.
2. Set the controls as for high-level test (step B2 above), except set the VOLUME control to minimum and the SELECTOR switch to MICROPHONE.
3. Adjust the output level of the IM meter to produce an 8-volt signal at the TAPE RECORDING OUTPUT jack, as indicated on the VTVM.
4. Calibrate the IM meter and read the intermodulation distortion as indicated for the high-level test (steps B4 and B5 above). The IM distortion should be no greater than 0.15%.
5. Set the MODE switch and BALANCE control for channel A operation and repeat the procedure to check low-level IM distortion on channel A.



A. IM Distortion Test, High-Level



B. IM Distortion Test, Low-Level

Figure 6. Performance Verification Test Set-up